



# TOXIDROMES

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# Choose Collaborators Carefully!



# Searching for Clues



- ❑ History
- ❑ Physical Exam
- ❑ Laboratory Studies
- ❑ Treatment

# HISTORY

- When to suspect
- Approach to known exposure
- Approach to unknown exposure

# PHYSICAL EXAMINATION

- ✓ VS
- ✓ Eye exam
- ✓ Skin
- ✓ Neuro



# LABORATORY EXAM

- ✓ Anion gap, acid-base status, osmolar gap
- ✓ BUN/creat, UA
- ✓ ECG
- ✓ Abd film
- ✓ CXR
- ✓ Toxicology screen

# APPROACH TO TREATMENT

- ✓ Early and effective decontamination
- ✓ Supportive therapy
- ✓ Antidotes
- ✓ Enhanced elimination

# TOXIC SYNDROMES AND DRUG OVERDOSAGES

- Physiologic stimulants
- Physiologic depressants
- Other drug overdosages

# PHYSIOLOGIC STIMULANTS

- ❑ Anticholinergics
- ❑ Sympathomimetics (ex. cocaine)
- ❑ Hallucinogens
- ❑ Drug withdrawal
- ❑ Miscellaneous (thyroid hormones)

# ANTICHOLINERGICS

- ❑ ANTIHISTAMINES
- ❑ ANTIPSYCHOTICS
- ❑ BELLADONNA  
ALKALOIDS
- ❑ CYCLIC  
ANTIDEPRESSANT
- ❑ CYCLOBENZAPRINE
- ❑ PARKINSON'S DZ  
DRUGS
- ❑ GI/GU  
ANTISPASMODICS
- ❑ MYDRIATRICS
- ❑ PLANTS/  
MUSHROOMS

# ANTICHOLINERGICS: ATROPINE

## CLINICAL PRESENTATION

- “Hot as a hare, dry as a bone, mad as a hatter”
- Dryness of mouth
- flushed, hot, dry skin
- dilated and nonreactive pupils
- tachycardia
- hallucinations, restlessness



# ANTICHOLINERGIC: ATROPINE

## TREATMENT

- Gut decontamination
- Physostigmine
- Supportive care

# COCAINE

## CLINICAL PRESENTATION

- tachycardia, HTN arrhythmia
- can get hypotension and reflex bradycardia
- CNS stimulation

# COCAINE

## ■ TREATMENT

- CNS sedation
- Labetolol
- Treat hyperthermia
- ?Parlodel or desipramine

# Hallucinogens

- ✓ Stimulation of serotonergic system
- ✓ Illusions, visual hallucinations, sweating, tachycardia, pupillary dilatation
- ✓ Usu done in 12 hours
- ✓ No true withdrawal state

# Hallucinogens

## Treatment

- Generally do not require medical treatment
- Can use benzodiazepine for agitation
- Reduce stimuli
- Discontinuation can result in dysphoria from reduced serotonin activity. SSRI can be used for 3-6 months

# PHYSIOLOGIC DEPRESSANTS

- ☛ Cholinergics
- ☛ Narcotics
- ☛ Sympatholytics (cyclic antidepressants)
- ☛ Sedative-hypnotics
- ☛ Miscellaneous (carbon monoxide)

# CHOLINERGICS

- ✓ BETHANACOL
- ✓ CARBAMATE  
INSECTICIDES
- ✓ MYASTHENIA  
GRAVIS DRUGS
- ✓ EDROPHONIUM
- ✓ PHYSOSTIGMINE
- ✓ PILOCARPINE
- ✓ NICOTINE

# CHOLINERGICS: CLINICAL PRESENTATION

- ✓ DEFECATION
- ✓ URINATION
- ✓ MOIOSIS
- ✓ BRONCHO-CONSTRICKTION
- ✓ BRADYCARDIA
- ✓ EMESIS
- ✓ LACRIMATION
- ✓ SALIVATION



# CHOLINERGICS

## ■ TREATMENT

- Gastric decontamination
- Respiratory support
- Atropine
- Pralidoxime
- Cardiac monitoring
- Tx seizures with benzodiazepine

# OPIATES

## CLINICAL PRESENTATION

- Pinpoint pupils
- Respiratory depression
- Bradycardia
- Hypotension
- Hypothermia
- Pulmonary edema
- Seizures



# OPIATES

## TREATMENT

- Acute
  - Naloxone
- Chronic
  - Methadone
  - Catapres
  - Naltrexone

# OPIATES

## POSSIBLE COMPLICATIONS

- Aspiration
- Pulmonary edema
- Withdrawal symptoms
- Need for repeated doses

# BENZODIAZIPINES

- 🕒 CLINICAL PRESENTATION
- 🕒 Respiratory depression
- 🕒 Drowsiness
- 🕒 Coma



# BENZODIAZIPINES

## ■ TREATMENT

- Generally requires no pharmacologic intervention
- Flumazenil



# CYCLIC ANTIDEPRESSANTS

## CLINICAL PRESENTATION

- Most are combination anticholinergic and sympatholytic
- Coma
- Seizures
- Hypotension
- Cardiac dysrhythmias

# CYCLIC ANTIDEPRESSANTS

## ■ TREATMENT

- Gastric decontamination
- Treat cardiac dysrhythmias
- Treat seizures

# Carbon Monoxide Poisoning

- ☞ Most common cause of death by poisoning
- ☞ Symptoms vary:
  - Mild: HA, mild dyspnea
  - Mod: HA, dizziness, N/V, dyspnea, irritability
  - Severe: Coma, seizures, CV collapse

# OTHER DRUGS

- ❑ DISSOCIATIVE DRUGS
- ❑ ACETOMINOPHEN
- ❑ SALICYLATES
- ❑ DIGOXIN
- ❑ SEROTONIN SYNDROME
- ❑ LITHIUM
- ❑ “CLUB DRUGS”

# DISSOCIATIVE DRUGS

- ◉ Ketamine, Phenylcyclidine (PCP),  
Phenylcyclohexylpyrrolidine (PHP)
- ◉ Acts on all six neurotransmitter systems
  - Anticholinergic: dry skin, miosis
  - Dopamine/norepinephrine: agitation, delusions
  - Opioid: pain perception alterations
  - Serotonin: perceptual changes
  - GABA receptor inhibition: excitation

# DISSOCIATIVE DRUGS

## Treatment

- Haloperidol

- Presynaptic dopamine antagonist
- Shifts the dopamine-acetylcholine activity ratio in the limbic system
- Therefore can counteract the dopamine stimulation and cholinergic antagonism of the drug

# ACETAMINOPHEN

## CLINICAL PRESENTATION

- No specific symptoms or signs

# ACETAMINOPHEN

## ■ TREATMENT

- Gastric decontamination
- N-acetylcysteine

# SALICYLATES

## CLINICAL PRESENTATION

- Mixed acid-base disturbances
- GI: N/V, abdominal pain
- CNS: tinnitus, lethargy, seizures, cerebral edema, irritability
- Resp: pulmonary edema
- Coagulation abnormalities

# DIGOXIN

## CLINICAL PRESENTATION

- Nausea/vomiting
- Mental status changes
- Cardiovascular symptoms

# DIGOXIN

## TREATMENT

- Gastric decontamination
- Fab fragments

# SEROTONIN SYNDROME

## CLINICAL PRESENTATION

- Neurobehavioral: mental status changes, agitation, confusion, seizures
- Autonomic: hyperthermia, diaphoresis, diarrhea, tachycardia, HTN, salivation
- Neuromuscular: myoclonus, hyperreflexia, tremor, muscle rigidity

# SEROTONIN SYNDROME

## TREATMENT

- Respiratory support
- Temperature control
- Sedatives
- Muscle relaxants

# LITHIUM

## ↳ Symptoms

- GI: vomiting, diarrhea
- Neuro: tremors, confusion, dysarthria, vertigo, choreoathetosis, ataxia, hyperreflexia, seizures, opisthotonos, and coma
- Labs: decreased anion gap

## ↳ Treatment

- Levels  $>2.5$  meq/L
- Gastric lavage
- Urinary alkalinization
  - Not very effective
- Aminophylline
- Hemodialysis
  - $>3.5$  mEq/L (acute)
  - $>2.5$  w/ chronic ingestion or renal insufficiency

# “CLUB DRUGS”

- Rave parties increasing in popularity
- Drugs meant to intensify sensory experience of lights/music, facilitate prolonged dancing



# MDMA “Ectasy”

- Structurally resembles amphetamine (stimulant) and mescaline (hallucinogen)
- SX: trismus, bruxism, tachycardia, mydriasis, diaphoresis, hyperthermia, hyponatremia, hepatic failure, CV toxicity (tachycardia, HTN)

## ➤ Treatment

- Mainly supportive
- Benzodiazepines
- Calm environment
- Avoid beta-blockers
  - Can result in unopposed alpha effect
  - If essential consider labetolol

# GHB: Date rape drug

“Georgia homeboy, liquid ecstasy, or grievous bodily harm”

- Developed as anesthetic agent. GABA analog

- Symptoms
  - Bradycardia
  - Hypothermia
  - hypoventilation
  - Somnolence
  - Vomiting
  - Myoclonic jerking

- Treatment
  - Conservative mgmt
  - Intubation
  - Careful exam for sexual assault

# Ketamine: “K”, “special K”

- Developed as an anesthetic, structurally resemble PCP

- Symptoms

- Nystagmus
- Tachycardia
- HTN
- vomiting

- Treatment

- Benzodiazepines
- Supportive care
- IV
- Can consider urine alkalinization

# CLINICAL SCENARIO 1

■ A 48 year old unconscious mermaid is brought to the hospital. She is convulsing and has an odor of garlic on her breath. She is incontinent for urine and stool. On exam her VS: T99, HR50, RR24, BP146/88. Skin is diaphoretic. She is drooling. Pupils are constricted. Lungs diffuse wheezing.



# CLINICAL SCENARIO 1

- ☞ Recognize: Cholinergic poisoning
- ☞ Treatment:
  - Gastric decontamination
  - Respiratory support
  - Cardiac monitoring
  - Atropine followed by pralidoxime
  - Treat seizures with benzodiazepine

# CLINICAL SCENARIO 2

- 17 year old male presents to the hospital with somnolence, slurred speech, and combative behavior. His younger sister said he showed her a handful of small seeds that he was going to take. On exam his VS: T100, HR120, BP100/60, RR22. Skin is warm and dry. Mucous membranes are dry. Pupils are dilated and not reactive.

# CLINICAL SCENARIO 2

- Recognize: Anticholinergic poisoning
- Treatment
  - Supportive care
  - Physostigmine
    - Coma
    - Arrhythmias
    - Severe HTN
    - Seizures

# CLINICAL SCENARIO 3

- 26 y/o bear presents unresponsive. His young friend accompanies him and states he took a handful of pills because he was in pain. On exam his VS: T96, HR40, RR6, BP50/30. Pupils are 3mm.



# CLINICAL SCENARIO 3

- 🕒 Recognize: Opioid poisoning
- 🕒 Treatment
  - Naloxone

# Summary

- ❑ Don't panic!!
- ❑ Recognize your clues
- ❑ Look for the toxicome syndrome
- ❑ For extra credit:  
What is this guy on?!

